



Dŵr Cymru  
Welsh Water

Lower Farm Barns Isycoed Wrexham



**LEGEND(Representative of most common features)**

Waste network:	
	Foul chamber
	Surface water chamber
	Combined sewer
	Special purpose chamber
	Treatment works
	Pumping station
	Surface water
	Foul
	Normal S24 sewers (for indicative purposes only)
	Outfall
	Private sewer subject to Sect. 104 adjustment agreement
	Private sewer
	Private sewer subject to Sect. 104 adjustment agreement
	Private Sewer Transfer
	Lateral Drain
	Inspection Chamber

**Notes:**

Whilst every reasonable effort has been taken to correctly record the pipe material of DCWW assets, there is a possibility that in some cases, pipe material (other than Asbestos Cement or Pitch Fibre (PF)) may be found to be asbestos cement (AC) or Pitch Fibre (PF). It is therefore advisable that the possible presence of AC or PF pipes be anticipated and considered as part of any risk assessment prior to excavation.

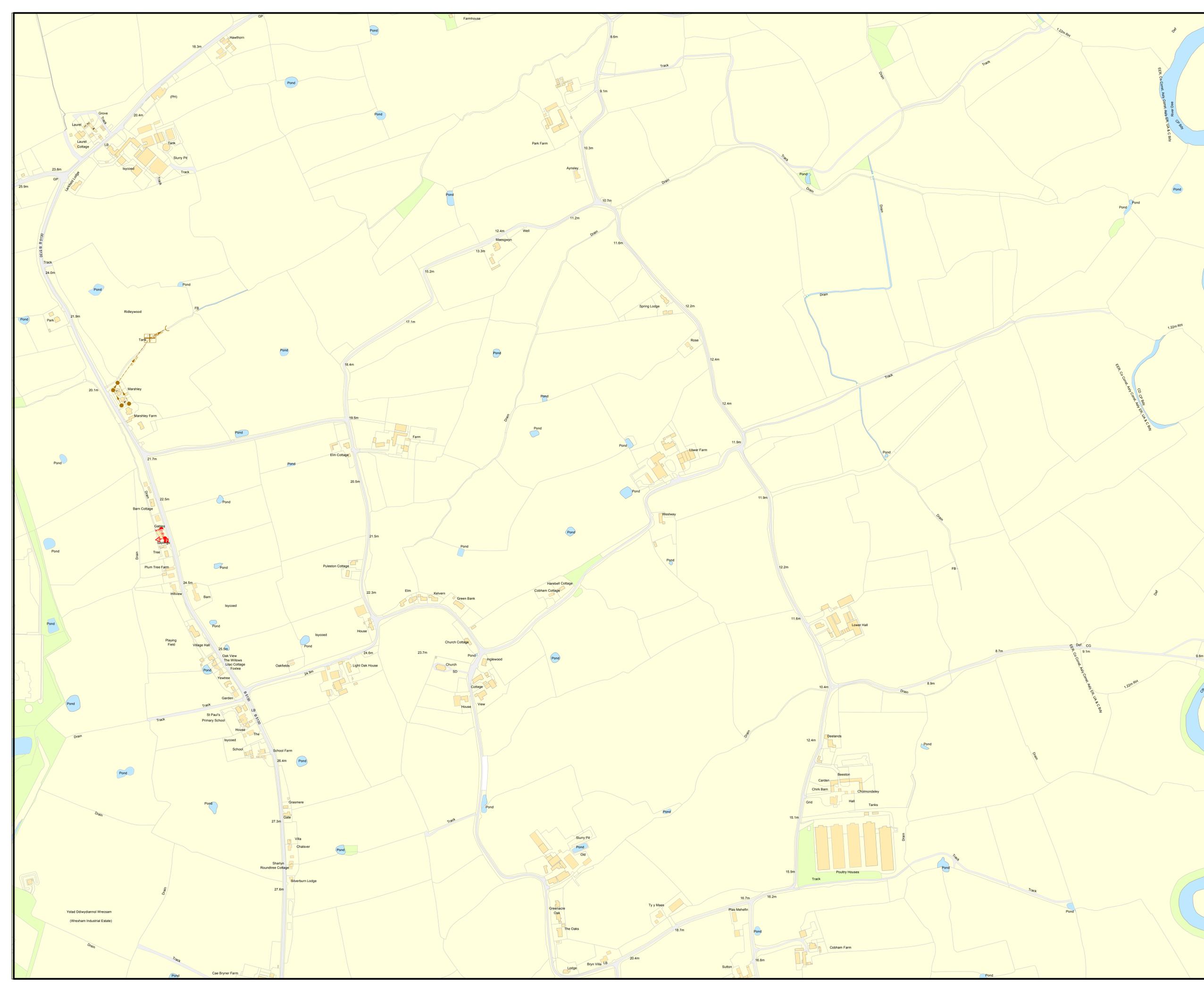
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Service pipes are not generally shown but their presence should be anticipated.

**EXACT LOCATIONS OF ALL APPARATUS TO BE DETERMINED ON SITE.**

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Map Ref: 340768,350466  
Map scale: 1:2500  
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Printed on: 21 Jul 2022



# SLADEN ASSOCIATES

*Environmental and Geotechnical Consultants*

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TEL: 01746 860222 FAX: 01746 862330

1 March 2024

Mr P Robinson  
Elm Cottage  
Lower Barns  
Malpas  
Cheshire  
SY14 7LB

Dear Phil

## **Re: Soakaway Testing at Lower Farm Barns, Bowling Bank, Wrexham**

Further to your instruction, we undertook three soakaway tests to assess the suitability of drainage fields for use in waste water treatment (BS 6297:2007 + A1:2008) and a trial pit (TP A) to establish the underlying geology. The soakaway test pits were hand excavated and a machine excavator was used for TP A. The tests were undertaken in general accordance with BS 6297 methodology.

Figure 1, attached, shows the site location and the work was undertaken on 25th January 2024. Detailed logs of the trial pits are attached, together with Figure 2 showing the test hole locations.

The study area is shown by maps published by the British Geological Survey to be underlain by the Kinnerton Sandstone Formation of Triassic Age. The solid geology is shown to be overlain by Glacial Till, with River Terrace Deposits present approximately 160m to the east.

The trial pits on site have identified River Terrace Deposits, below topsoil, and these were found to extend to at least 600mm below ground level in all the trial pits. These marginal deposits were found to be cohesive, with very limited granular inclusions. The River Terrace Deposits were underlain by cohesive Glacial Till in TP A to the base at 1.9m. The bedrock was not encountered in any of the trial pits.

A groundwater monitoring standpipe was installed in TP A and this was monitored on 1st February and encountered water at 1.78m below ground level.

### Soakaway Tests

The three soakaway pits were excavated to 0.6m and were filled with 300mm of water. None of the pits drained over the monitoring period of 3 hours.

The results of the test are summarised as follows:

Location	Depth of Water at Start of Test (mm)	Depth of Water After Three Hours	Derived Infiltration Rate
TP1	300	285	Fail
TP2	300	265	Fail
TP 3	300	230	Fail

Extrapolating the drop in water depth after three hours resulted in test failures, as the pits need to have emptied by 6 hours.

The strata tested is not suitable for field drainage for waste water treatment.

All the strata encountered within the trial pits on site would have a very low permeability, typically in the range  $1 \times 10^{-7}$  to  $1 \times 10^{-9}$  m/s.

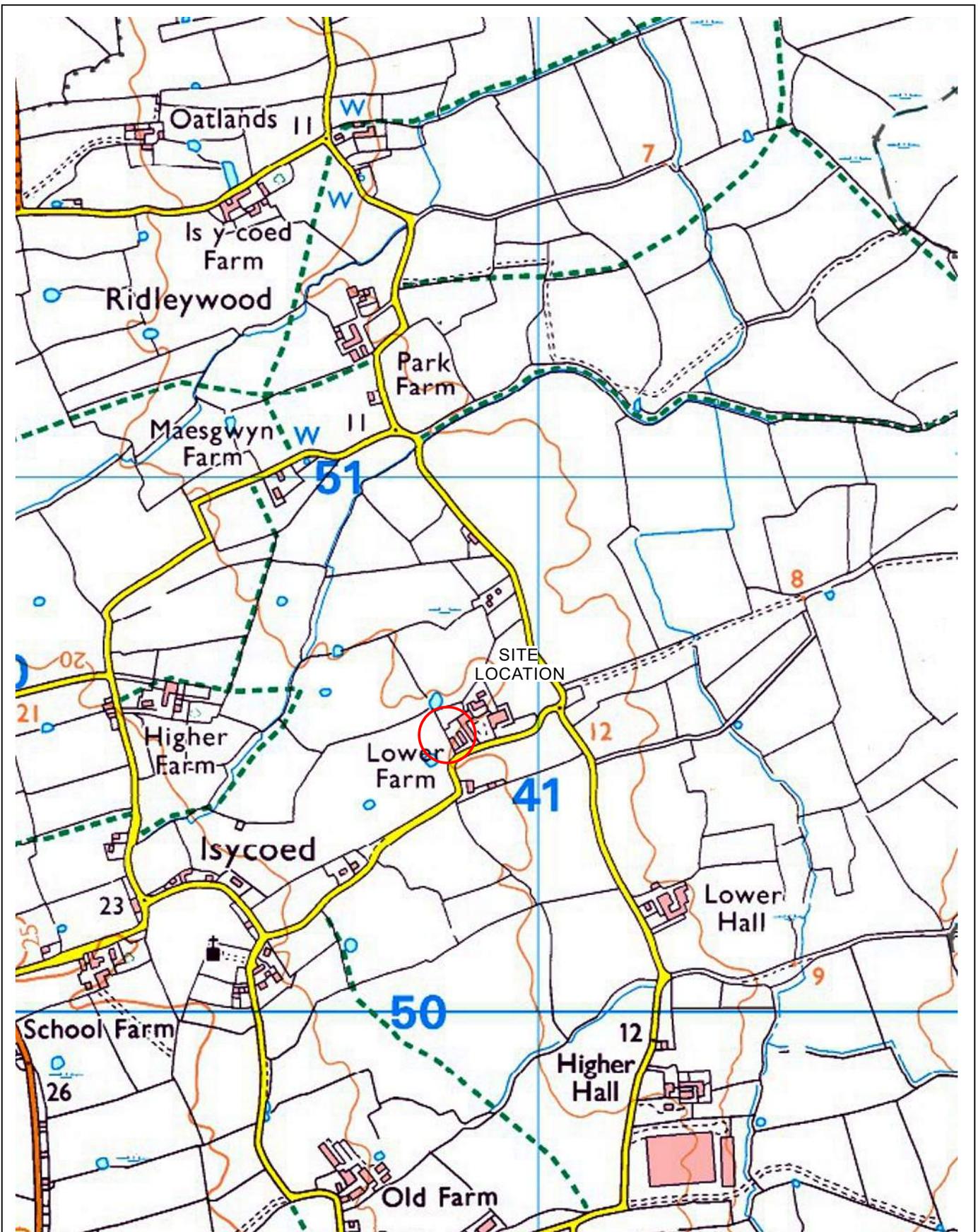
We trust the above meets your present requirements, should you need any additional information, please do not hesitate to contact our office.

Yours sincerely

G L Dorrell BEng, FGS  
Director

Attachments:

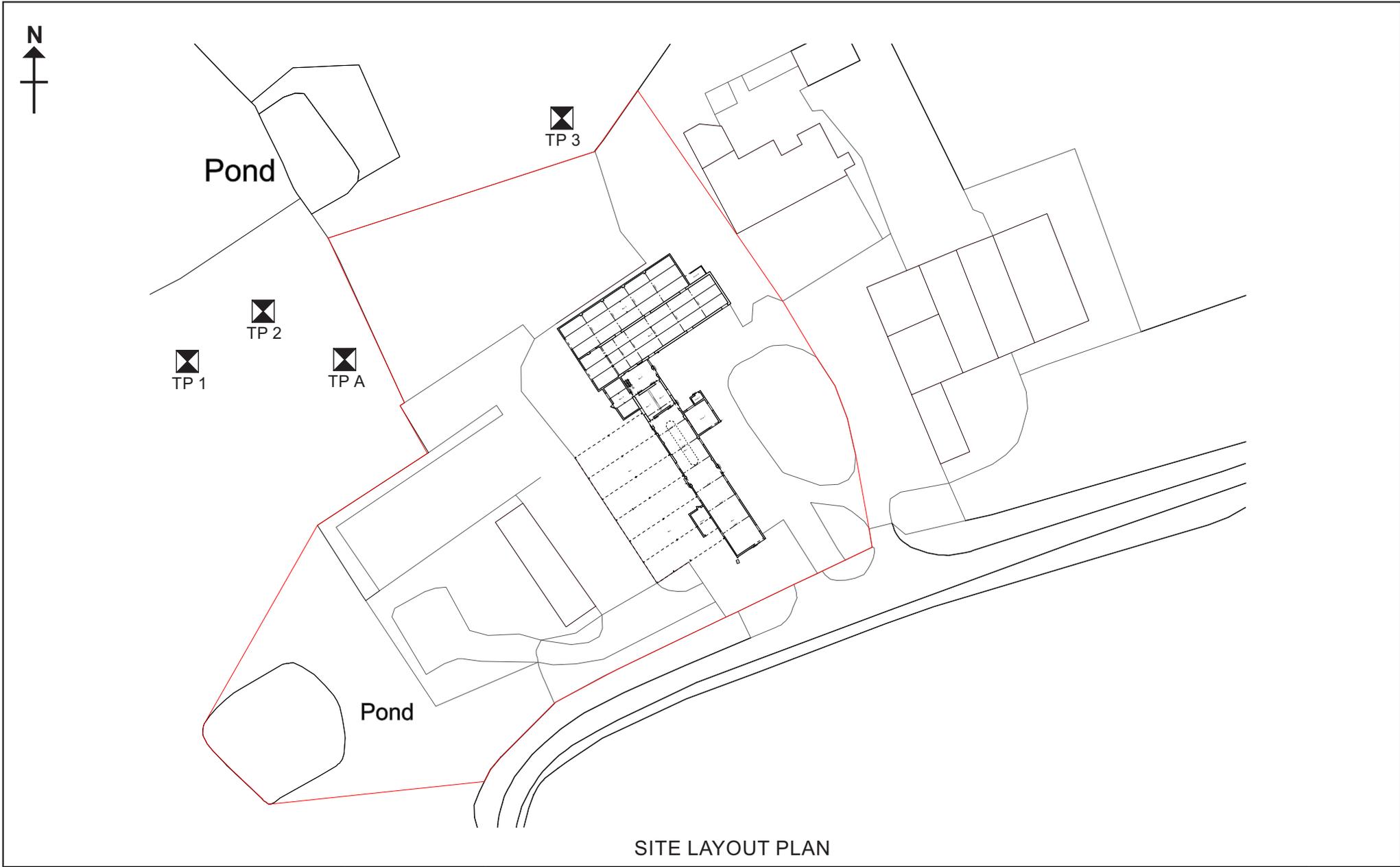
Figure 1      Location Plan  
Figure 2      Site Layout Plan  
Trial Pit Logs



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SITE LOCATION PLAN

<p><b>SLADEN ASSOCIATES</b></p>	<p>Report No 24-2659</p>	<p>Project Lower Farm Barns Bowling Bank Is-Y-Coed</p>	<p>Figure <b>1</b></p>
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SITE LAYOUT PLAN

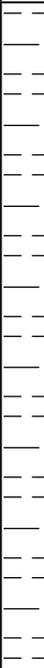
<p><b>SLADEN ASSOCIATES</b></p>	<p>Report No 24-2659</p>	<p>Project Lower Farm Barns, Bowling Bank, Is-Y-Coed</p>	<p>Figure <b>2</b></p>
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# SLADEN ASSOCIATES

Unit 5, Netherton Workshops, Highley, Bridgnorth, Shropshire, WV16 6NN Tel:01746 860222 Fax:01746 862330

**Trial Pit No: A**

Page 1 of 1

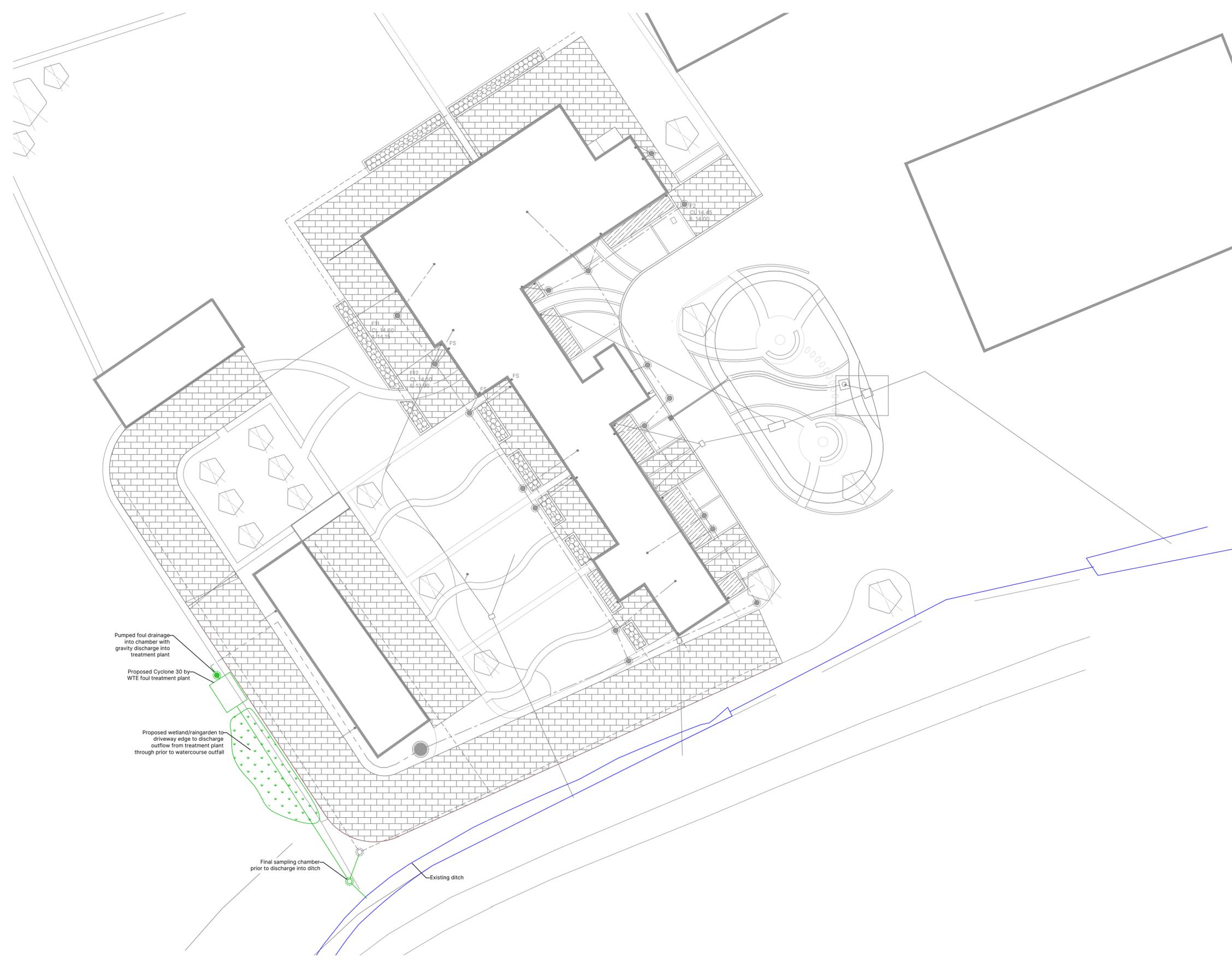
Equipment & Methods		Job No: 23-2659					
Machine Excavator		Project: Lower Barns Farm, Bowling Bank, Wrexham					
Carried out for		Ground Level		Coordinates			Date
Plant & Robinson Construction		0		E N			25-01-24
Descriptions	Legend	Depth	Reduced Level	Samples/Tests/Notes			Field Records
				Depth	Sample		
					Type	No.	
Soft to firm brown sandy CLAY with much root. (TOPSOIL)		0.25	-0.25				
Firm light orangey brown slightly gravelly CLAY. Gravels are fine to medium rounded to sub rounded quartz and sandstone. Occasional clayey sand lenses. (RIVER TERRACE DEPOSITS)		0.60	-0.60				
Firm to stiff, becoming stiff orange brown becoming red brown and grey slightly sandy, slightly gravelly CLAY. Gravels are medium to coarse rounded to subrounded quartz and sandstone. (GLACIAL TILL)		1.90	-1.90				
End of Trial Pit							
Additional Comments Groundwater: slight seepage 0.6m. Pit sides stable during excavation. Groundwater/gas monitoring standpipe installed to 1.9m.							Logged by GLD
							Figure

Equipment & Methods Machine Excavator		Job No: 23-2659 Project: Lower Barns Farm, Bowling Bank, Wrexham					
Carried out for Plant & Robinson Construction		Ground Level 0		Coordinates E N			Date 25-01-24
Descriptions	Legend	Depth	Reduced Level	Samples/Tests/Notes			Field Records
				Depth	Sample Type	Sample No.	
Soft dark brown sandy CLAY with much root. (TOPSOIL)		0.25	-0.25				
Soft to firm brown silty CLAY with some roots. (RIVER TERRACE DEPOSITS)		0.40	-0.40				
Firm orangey brown CLAY. (RIVER TERRACE DEPOSITS)		0.60	-0.60				
End of Trial Pit							
Additional Comments Groundwater: none encountered. Pit sides stable during excavation. Soakaway test conducted in excavation.							Logged by GLD
							Figure

Equipment & Methods		Job No: 23-2659					
Machine Excavator		Project: Lower Barns Farm, Bowling Bank, Wrexham					
Carried out for		Ground Level		Coordinates			Date
Plant & Robinson Construction		0		E N			25-01-24
Descriptions	Legend	Depth	Reduced Level	Samples/Tests/Notes			Field Records
				Depth	Sample		
					Type	No.	
Soft to firm brown sandy CLAY with much root. (TOPSOIL)							
Firm brown silty CLAY with some roots. (RIVER TERRACE DEPOSITS)		0.20	-0.20				
Firm light brown and orangey brown CLAY. (RIVER TERRACE DEPOSITS)		0.40	-0.40				
End of Trial Pit		0.60	-0.60				
Additional Comments Groundwater: none encountered. Pit sides stable during excavation. Soakaway test conducted in excavation.							Logged by GLD
							Figure

Equipment & Methods Machine Excavator		Job No: 23-2659 Project: Lower Barns Farm, Bowling Bank, Wrexham					
Carried out for Plant & Robinson Construction		Ground Level 0		Coordinates E N			Date 25-01-24
Descriptions	Legend	Depth	Reduced Level	Samples/Tests/Notes			Field Records
				Depth	Sample Type	Sample No.	
Soft to firm brown sandy CLAY with much root. (TOPSOIL)		0.20	-0.20				
Firm orangey brown and grey slightly sandy CLAY. (RIVER TERRACE DEPOSITS)		0.60	-0.60				
End of Trial Pit							
Additional Comments Groundwater: none encountered. Pit sides stable during excavation. Soakaway test conducted in excavation.							Logged by GLD
							Figure

CAD FILE NAME: C:\Users\Lisa Sawyer\Land Studio Ltd\CompanySP - Documents\Company Data\04 Projects\200\_289\285 Lower Farm Barns\01 CAD REV\TSS\285\_LST\_XX\_XX\_DR\_D\_0001 Drainage Outfall To Ditch.dwg



- Notes
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Pumped foul drainage into chamber with gravity discharge into treatment plant

Proposed Cyclone 30 by WTE foul treatment plant

Proposed wetland/raingarden to driveway edge to discharge outflow from treatment plant through prior to watercourse outfall

Final sampling chamber prior to discharge into ditch

Existing ditch

P02 29.08.24	NRW Discharge Application
P01 14.12.23	Draft NRW Discharge Application
Rev1 Date	Description

Client:  
Plant & Robinson Construction

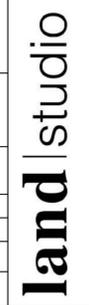
Project:  
Lower Farm Barns

Drawing Title:  
Drainage Outfall Location

Drawing No:  
XXX-LST-XX-XX-DR-D-0100

Drawn By: AW	Date: 14.12.2023
Checked By: LS	Date: 28.08.2024
Drawing Scale: 1:200	Sheet Size: A1

Revision	Status
P02	S2



## Lisa Sawyer

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**From:** Brannan, Callum <callum.brannan@cyfoethnaturiolcymru.gov.uk>  
**Sent:** 17 August 2023 09:48  
**To:** Lisa Sawyer  
**Subject:** RE: Lower Farm Barns - Ref CAS-99111-H4G5 - P/2019/0647

Morning Lisa,

Apologies for the delay in getting back to you on this one, the matter needed to be discussed with a couple of internal departments/teams.

Unfortunately, NRW cannot guarantee that a permit application will be successful until an application has been submitted. However, our internal Water Quality Permitting Team have provided the following:

*This discharge is planned to go into a passing section of the River Dee PSAC in which case it won't be refused outright. Modelling should be carried out to establish the maximum amount of additional phosphorus entering the SAC river. If this addition is below 3% of the Conservation Objective target on phosphorus and the addition does not cause the SAC river to breach its Conservation Objective, for HRA, we can conclude 'no likely significant effect'. Determination process can proceed on the basis that the permit is likely to be issued subject to all other assessment criteria being met.*

*It is worth mentioning, phosphate dosing comes with its own problems which may require addressing during the determination period and regardless of issues surrounding PSAC catchments, the application may be refused on a number of other issues.*

Ultimately, an application needs to be submitted for the permitting team to assess the application as they cannot pre-determine the application at this stage.

I appreciate this doesn't provide much comfort in terms of whether the application will be successful. However, submitting the application is the only way.

Many thanks,

**Callum Brannan**

**Swyddog yr Amgylchedd** / Environment Officer

**Tim Amgylchedd Sir y Fflint a Wrecsam** / Flintshire & Wrexham Environment Team

**03000 653 608**

**Fe / Fo / He / Him**



**Croesewir gohebiaeth yn Gymraeg a byddwn yn ymateb yn Gymraeg, heb i hynny arwain at oedi.**

Correspondence in Welsh is welcomed, and we will respond in Welsh without it leading to a delay.

**FINAL**

# **P MODELLING**

Lower Farm Wrexham

**Project no. 4021709**

Prepared for:

Land Studio

30<sup>th</sup> August 2024





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### Details of document preparation and issue:

Version no.	Prepared	Checked	Reviewed	Approved	Issue date	Issue status
1	Edward Smith	Laura Hobbs	Natalie Jordan	Mark Barnett	19/08/2024	Draft
2	Edward Smith	Laura Hobbs	Natalie Jordan	Mark Barnett	30/08/2024	Final

Project no. 4021709

Client's reference no.

File name: 4021709-BUK-ZZ-00-RP-EN-00001.docx

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## 1. Introduction

### 1.1 Background

Binnies UK Limited (BUKL) has been commissioned by Land Studios to undertake water quality modelling for a proposed new development of five new residential properties and associated private wastewater treatment plan, at Lower Farm, Wrexham (approximate Grid Reference: SJ 40848 50526), discharging wastewater into the River Dee. The objective of the modelling was to assess the potential impacts from increased phosphorous concentrations on the River Dee Special Area of Conservation (SAC), addressing concerns and guidance provided by Natural Resources Wales (NRW). A requirement, set by NRW, for the development to go ahead is that there would be no significant impact on the water quality of the River Dee.

### 1.2 Purpose

The purpose of this report is to detail the methodology and data used in the water quality modelling, as well as showing the subsequent findings.

## 2. NRW guidance

### 2.1 Nutrient sensitive river Special Areas of Conservation

Natural Resources Wales (NRW) recently released updated guidance highlighting the importance of controlling nutrient impacts from new developments on water quality, particularly in Special Area of Conservation river catchments (NRW, 2024). This guidance states that new developments are not permitted unless it can be demonstrated that they will not exacerbate water quality issues or cause significant environmental harm. The current guidance on this issue from NRW focuses on concentration, rather than loading. Development proposals within a SAC river catchment must undergo a Habitats Regulations Assessment (HRA) with two principal stages:

- Test of Likely Significant Effect – this is a screening assessment to determine whether a development has the potential to affect an SAC. Where a likely significant effect can be ruled out, no further assessment under the Habitats Regulations is required.
- Appropriate Assessment – where a proposed development is considered likely to have a significant effect, or such an effect cannot be ruled out, a more detailed assessment of the potential impacts is required. The purpose of the Appropriate Assessment is to assess the implications for the river SAC in view of that site's conservation objectives, and thereby determine whether the proposal could have an adverse effect on the integrity of the site.

This guidance builds on previous reports. NRW's report, 'Compliance Assessment of Welsh River SACs Against Phosphorus Targets,' revealed that over 60% of water bodies in SAC river catchments were failing to meet the revised phosphorus targets (NRW, 2021). The water body within the River Dee SAC of specific interest to this assessment is GB111067057080, Dee - Chester Weir to Ceiriog. This water body has a target level of 50µg/l and is currently compliant.

### 3. Methodology

#### 3.1 Data

##### (a) Data needs

To undertake a water quality assessment and identifying potential impacts on the SAC a The River Quality Planning tool (RQP, version 6) was used to provide a mass balance calculation of changes in concentrations of nutrients in the River Dee. The tool needs several variables as inputs to determine the impact of input discharge quality. Table 1 below summarises these variables, assumptions and our approach to sourcing data for them.

Table 1. River Quality Planning tool (version 6) variables and approaches taken to source data.

Variable	Type of data used	Assumption
Upstream river flow	Measured flow per second	Present year (2024) excluded
Discharge flow	Calculation using best practice	Standard deviation set at 0.1
Upstream river quality	Measured orthophosphate concentration	Present year (2024) excluded
Discharge quality	Orthophosphate concentration	Standard deviation set at 0.1
Downstream target	Orthophosphate concentration	3% deterioration of current SAC target

For the tool we ensured that all of the data for each parameter, were in the same units and therefore, in the tests undertaken,  $\mu\text{g/l}$  was converted to  $\text{mg/l}$  by multiplying by a factor of 0.001 and  $\text{m}^3/\text{second}$  was converted to  $\text{m}^3/\text{day}$  by multiplying by a factor of 86,400.

##### (b) Assumptions

Some overarching assumptions were used for the assessment and modelling including:

- As per the British Flows and Loads guidance (British Water, 2013), it was assumed that there will be a maximum occupancy of the residential dwellings.
- The sewage treatment plant on site is outputting a maximum concentration of phosphorus based on efficiency tests by the treatment plants supplier.
- There is direct discharge from the development to the River Dee with no dilution (this was done as there was no flow data for the stream at the development, so a worse case assumption was take for calculating impacts).

##### (c) Data sources

Data used in the modelling was taken from government sources and best-practice guidance. Orthophosphate data is the focus, in line with NRW guidance. Data was chosen to provide a

pragmatic worst-case scenario on the scale of potential impact. Table 2 below gives a summary of the data available in the sources.

*Table 2 – Metadata for data sources.*

	Quality	Flow
<b>Data source</b>	Water quality archive	Gauging station data
<b>Website accessed via</b>	<a href="https://environment.data.gov.uk/water-quality/view/landing">https://environment.data.gov.uk/water-quality/view/landing</a>	<a href="https://nrfa.ceh.ac.uk/data/search">https://nrfa.ceh.ac.uk/data/search</a>
<b>Measuring authority</b>	Environment Agency	NRW
<b>Date From</b>	24/11/2021	01/10/1937
<b>Date To</b>	03/07/2024	30/9/2022
<b>Datapoints</b>	31	31,046
<b>Units</b>	mg/l	m <sup>3</sup> /s
<b>Sample location name</b>	River Dee at A534 Wrexham Road Bridge, Holt	Dee at Manley Hall
<b>Sample location grid reference</b>	SJ4102353411	SJ348414
<b>Sample location upstream or downstream of site?</b>	Downstream	Upstream
<b>Distance of sample location to site (km)</b>	3	10

#### (d) Baseline river quality – processing

Water quality data was taken from the Water Quality Data Archive (Environment Agency, Accessed June 2024). The sample point used has ID NW-26344EA, and is named River Dee at A534 Wrexham Road Bridge, Holt. The sampling point is just to the north and upstream of the site (Figure 1). The full dataset was not used as the year 2024 was excluded from our assessment due to it not being a full year of data. As such, we used 25 datapoints measured over 3 years at this sampling location. Three of the points were considered to be outliers (see Figure 2, outliers highlighted in red). Standard statistical processes were followed for determining outliers. Specifically, any datapoints outside the range of 1.5 times the interquartile range plus or minus quartile 3 or quartile 1, respectively, were considered to be outliers. For the quality data, this meant any data points with values above 0.05mg/l or below 0.002mg/l.

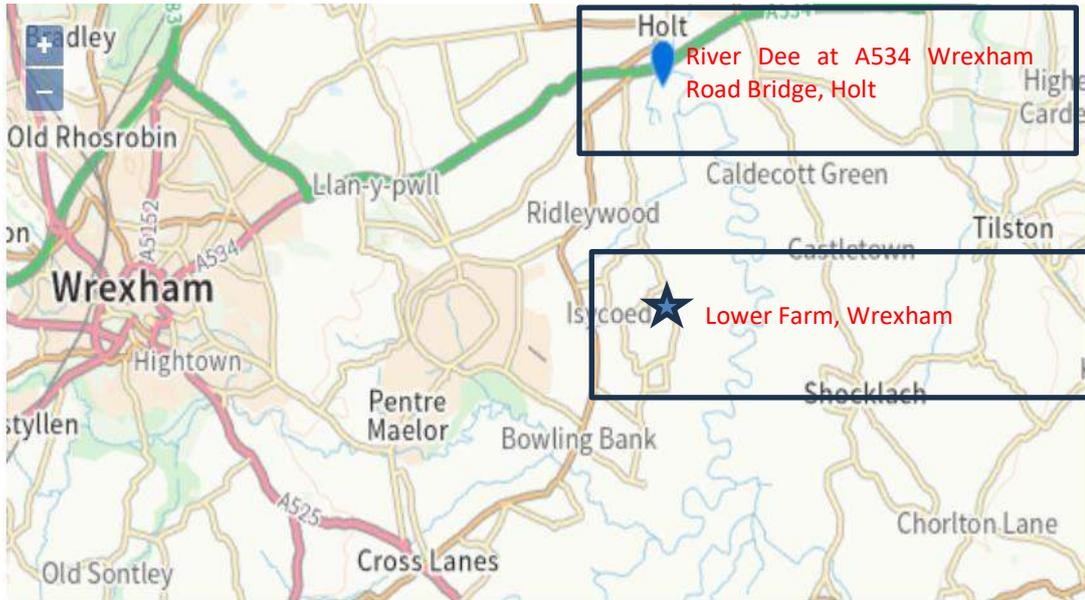


Figure 1 – The location of the development and water quality sample point used for quality data.

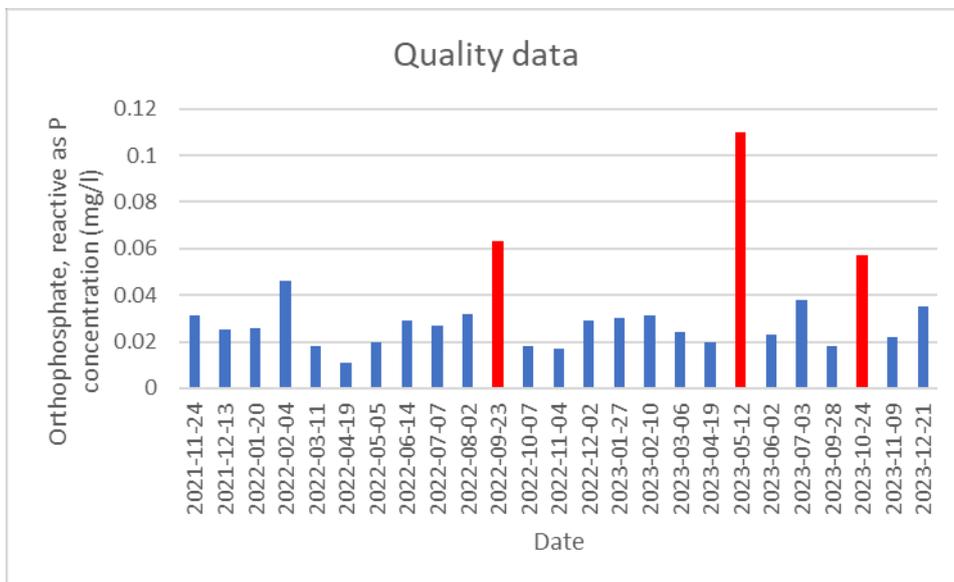


Figure 2 – The raw data from sampling point ID NW-26344EA with outliers highlighted red.

The sampling location was chosen as the closest most appropriate sample point to where the discharge from the site would join the Dee. As the discharge does not currently exist, this sample point is deemed good. In addition to this, there is only one other sampling point which is both upstream of the site and within a suitable proximity to it. This sampling point is named “Worthenbury Brook U/S Confluence Dee” and was deemed unsuitable as it is not on the Dee so would not give an appropriate or relevant baseline when considering impacts in this case.

**(e) Upstream river flow – processing**

Water flow data was taken from the National River Flow Archive (UK CEH, Accessed June 2024). The sample point used was local station number 067015, named Dee at Manley Hall. The sampling point is about 10km to the southwest and upstream of the site (Figure 3). There are 31,046 datapoints, measured daily over the last 85 years at this sampling location. Figure 4

below displays the raw data from this sampling location. There are a considerable number of inputs downstream of this point but upstream of the discharge and, as such, it is expected that using this data source will result in a worst-case estimate of final dilution.

As the flow data was so extensive, it was deemed suitable to consider two cases for sensitivity testing: one in which the full 85 years of data were used and another in which only the most recent 20 years of data were used. Outliers were determined following the same methodology as with river quality. For flow, datapoints were considered to be outliers if they were above 86.1m<sup>3</sup>/s in the full dataset and 86.8m<sup>3</sup>/s in the dataset over 20 years. See Figures 5-7 for graphical visualisations of this impact on the data. The overall effect is a significant reduction in range, resulting in a difference of around 6.5m<sup>3</sup>/s in the estimates of mean flow with or without outliers. Due to the large amount of data omitted by the removal of flow data outliers, sensitivity tests were undertaken both with and without outliers. Broadly speaking, the tests with outliers involve higher estimates for both average flow and average quality than for tests without outliers.

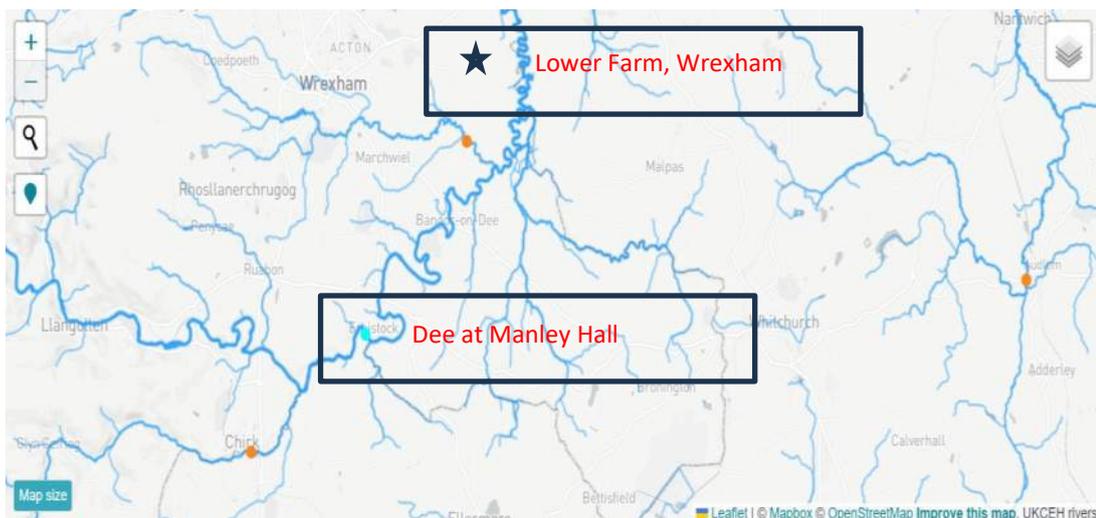


Figure 3 - The location of the sample point used for flow data.

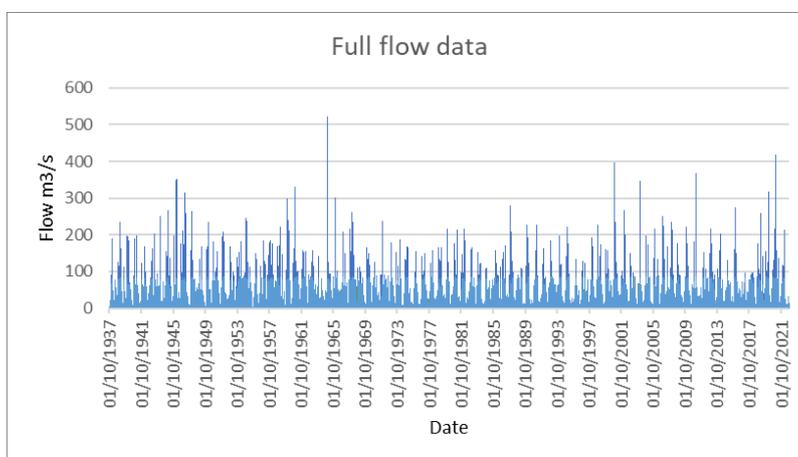


Figure 4 – The raw data from the Dee at Manley Hall gauging station.

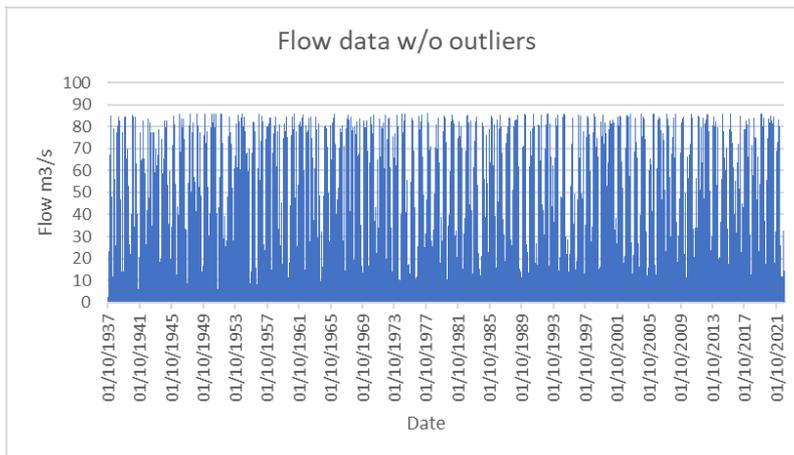


Figure 5: The full flow dataset with outliers removed.

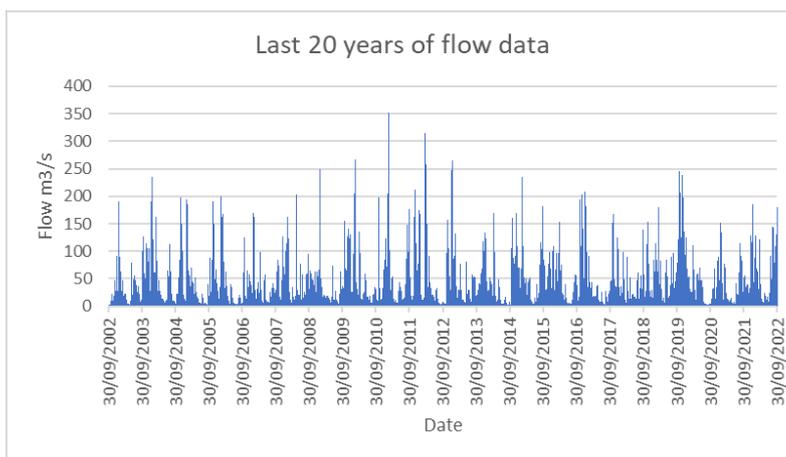


Figure 6: The flow dataset with only the last 20 years shown.

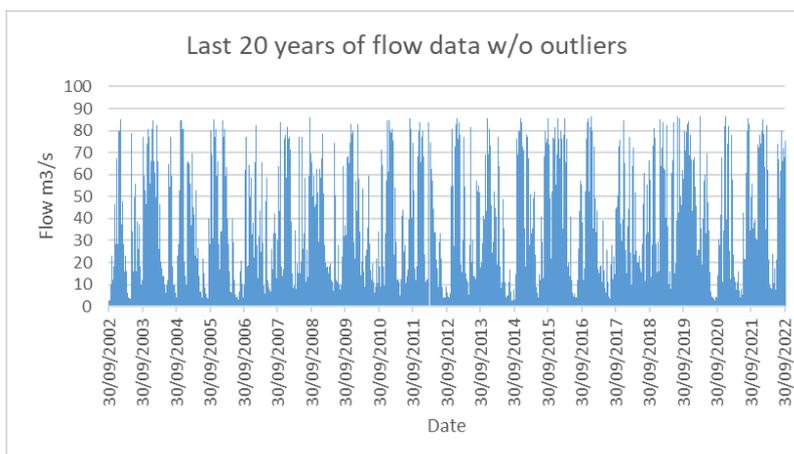


Figure 7: The flow dataset with only the last 20 years shown and outliers removed.

**(f) Discharge quality**

The client has stated that a Cyclone 30 sewage treatment plant will be installed to process wastewater from the site. At full capacity the Cyclone 30 will, on average, increase phosphorous concentrations in the river by 4.5mg/l, with an assumed worst-case standard deviation of 0.1.

### (g) Discharge flow

The discharge flow was calculated using the guidance in British Loads and Flows 4 (British Water, 2013). Specifically, it was calculated that the 5 residential properties would result in a discharge flow of 3.36m<sup>3</sup>/day. A worst-case standard deviation of 0.1 has been assumed.

## 3.2 Method

The raw data from above was used to generate the required inputs for the River Quality Planning (RQP) tool (version 6.0). Specifically, averages, standard deviations and 95<sup>th</sup> (low) percentiles were calculated. Additionally, a using the data from the River Dee an average which would constitute a 3% deterioration was calculated a reference point for the modelling and analysis of the results calculated as 0.0485mg/l). This data was then inputted into the RQP tool, which was set to calculate the impact of the discharge quality. Table 3 shows the data which was input into the RQP tool.

Table 3 – Data used in RQP tool.

Variable	Units	Full data – with outliers	Full data – without outliers	Last 20 years – with outliers	Last 20 years – without outliers
Mean u/s river flow	m <sup>3</sup> /s	2707821.8	2161242.7	2758563.0	2194724.0
95 <sup>th</sup> percentile low flow	m <sup>3</sup> /s	567648	543110.4	744768	743040
Mean discharge flow	m <sup>3</sup> /s	3.36	3.36	3.36	3.36
Standard deviation of discharge flow	m <sup>3</sup> /s	0.1	0.1	0.1	0.1
Mean u/s river quality	mg/l	0.032	0.02591	0.032	0.02591
Standard deviation of u/s river quality	mg/l	0.02024	0.00801	0.02024	0.00801
Number of samples	n/a	25	22	25	22
Mean discharge quality	mg/l	4.5	4.5	4.5	4.5

Variable	Units	Full data – with outliers	Full data – without outliers	Last 20 years – with outliers	Last 20 years – without outliers
Standard deviation	n/a	0.1	0.1	0.1	0.1
Number of samples	n/a	n/a	n/a	n/a	n/a
Downstream target quality	mg/l	0.0485	0.0485	0.0485	0.0485

#### 4. Results

Overall, the results show that, with the use of the chosen treatment plan, the Cyclone 30 system, the development of five residential properties will have no significant impact on the P concentrations of the River Dee SAC. With all results showing a change in phosphate concentrations of less than 3%. Indicating that the development and its potential impact would be in line with the NRW guidance. The full results are shown in Table 4. It is expected that the difference between downstream and upstream estimates in the “without outliers” cases is due to the rounding ability of the tool rather than any significant impacts.

*Table 4 – Results of the phosphate modelling for the River Dee*

Case	Post development phosphate quality (mg/l)	Baseline phosphate quality (mg/l)	Percentage change	Predicted SAC status post-development
Full data - With outliers	0.032	0.032	0%	Compliant
Full data – Without outliers	0.02591	0.026	0.35%	Compliant
Last 20 years – With outliers	0.032	0.032	0%	Compliant
Last 20 years – Without outliers	0.02591	0.026	0.35%	Compliant

## 5. References

British Water, 2013, Code of Practice Loads and Flows 4 Sizing Criteria, Treatment Capacity for Sewage Treatment Systems.

Environment Agency, Accessed June 2023, Water Quality Data Archive, Accessed June 2024, <https://environment.data.gov.uk/water-quality/view/landing#>

Natural Resources Wales, 2021, Compliance Assessment of Welsh River SACs against Phosphorus Targets.

Natural Resources Wales, 2024, Advice to planning authorities for planning applications affecting nutrient sensitive river Special Areas of Conservation.

UK Centre for Ecology and Hydrology, Accessed June 2024, <https://nrfa.ceh.ac.uk/data/search>

Water Technology Engineering (WTE) Ltd, Cyclone Certificate CE.

# APPENDICES

## Appendix A: RQP screenshots

### A.1 Full data with outliers

discharge

river

pollutant

mean upstream river flow

the 95-percentile low flow

mean discharge flow

standard deviation

mean u/s river quality  (0.025 - 0.039)

standard deviation  (0.016 - 0.025)

number of samples

mean discharge quality  (4.38 - 4.62)

standard deviation  (0.033 - 0.17)

number of samples   make permanent

the 95-percentile  (4.57 - 5.04)

the 99-percentile  (4.63 - 5.26)

the 99.5-percentile  (4.64 - 5.34)

correlation: river and discharge flow   make permanent

downstream target   calculate required discharge quality

mean   calculate impact of input discharge quality

mean d/s river quality  (0.025 - 0.039)

standard deviation  (0.015 - 0.025)

number of samples

correlation: river flow and quality   make permanent

correlation: discharge flow and quality   make permanent

MASS BALANCE: Monte Carlo  
Calculations: 25 July 2024 at 04:09

### A.2 Full data without outliers

discharge

river

pollutant

mean upstream river flow

the 95-percentile low flow

mean discharge flow

standard deviation

mean u/s river quality  (0.023 - 0.029)

standard deviation  (0.0061 - 0.010)

number of samples   make permanent

mean discharge quality  (4.38 - 4.62)

standard deviation  (0.033 - 0.17)

number of samples   make permanent

the 95-percentile  (4.57 - 5.04)

the 99-percentile  (4.63 - 5.26)

the 99.5-percentile  (4.64 - 5.34)

correlation: river and discharge flow   make permanent

downstream target   calculate required discharge quality

mean   calculate impact of input discharge quality

mean d/s river quality  (0.023 - 0.029)

standard deviation  (0.0059 - 0.0099)

number of samples

correlation: river flow and quality

correlation: discharge flow and quality

MASS BALANCE: Monte Carlo  
Calculations: 25 July 2024 at 04:11

### A.3 Last 20 years with outliers

discharge

river

pollutant

mean upstream river flow

the 95-percentile low flow

mean discharge flow

standard deviation

mean u/s river quality  (0.025 - 0.039)

standard deviation  (0.016 - 0.025)

number of samples

mean discharge quality  (4.38 - 4.62)

standard deviation  (0.033 - 0.17)

number of samples   make permanent

the 95-percentile  (4.57 - 5.04)

the 99-percentile  (4.63 - 5.26)

the 99.5-percentile  (4.64 - 5.34)

correlation: river and discharge flow   make permanent

MASS BALANCE: Monte Carlo  
Calculations: 25 July 2024 at 04:12

downstream target   calculate required discharge quality

mean   calculate impact of input discharge quality

mean d/s river quality  (0.025 - 0.039)

standard deviation  (0.015 - 0.025)

number of samples

correlation: river flow and quality

correlation: discharge flow and quality

### A.4 Last 20 years without outliers

discharge

river

pollutant

mean upstream river flow

the 95-percentile low flow

mean discharge flow

standard deviation

mean u/s river quality  (0.023 - 0.029)

standard deviation  (0.0061 - 0.010)

number of samples   make permanent

mean discharge quality  (4.38 - 4.62)

standard deviation  (0.033 - 0.17)

number of samples   make permanent

the 95-percentile  (4.57 - 5.04)

the 99-percentile  (4.63 - 5.26)

the 99.5-percentile  (4.64 - 5.34)

correlation: river and discharge flow   make permanent

MASS BALANCE: Monte Carlo  
Calculations: 25 July 2024 at 04:13

downstream target   calculate required discharge quality

mean   calculate impact of input discharge quality

mean d/s river quality  (0.023 - 0.029)

standard deviation  (0.0059 - 0.0099)

number of samples

correlation: river flow and quality

correlation: discharge flow and quality

In pursuance of its powers under the Acts and Orders referred to below, the County Borough Council as Local Planning Authority, hereby determines your application in accordance with the particulars and plans comprising the application



<b>Applicant</b>	GRAHAM, TERENCE AND LINDA RIGBY AND DONE	<b>Code Number</b>	ISY P/2019/0647
<b>Agent</b>	S MURRAY & ASSOCIATES CROSS COTTAGE CASTLE STREET HOLT WREXHAM LL13 9YL	<b>Date Received</b>	23/08/2019
		<b>Decision Date</b>	27/01/2020

**Town and Country Planning Act, 1990**

**Location of application**

LOWER FARM, LOWER FARM ROAD, BOWLING BANK, WREXHAM, LL13 9RY

**Description of application**

CONVERSION OF FARM BUILDINGS TO FORM 6 NO. DWELLINGS, ERECTION OF ASSOCIATED CAR PORTS / GARAGES, AND CHANGE OF USE OF LAND TO ALLOW FOR THE GRAZING OF HORSES

In reaching this decision the Council has had regard to the relevant policies in the Wrexham Unitary Development Plan which are as follows:-

- |      |   |
|------|---|
| EC6  | Biodiversity Conservation                                     |
| GDP1 | Development objectives  |
| H3   | Residential conversion of buildings outside settlement limits |
| H5   | Housing in the countryside                                    |
| PS2  | Development and the environment                               |
| PS3  | Brownfield Land   |
| PS4  | Settlement Pattern  |
| T8   | Parking   |

Revision	Date	Description of Decision
0	27/01/2020	Planning permission issued

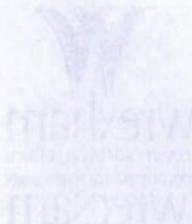
**Particulars of decision that permission be GRANTED  
Subject to the following:-**

**Condition(s)**

1. The development hereby permitted shall be commenced before the expiry of five years from the date of this permission.

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2. The development shall only be carried out in strict accordance with the details shown on the approved drawings numbered 01E, 02A, 03, 04, 05, 06, 07B, 08, 09, 10, 11, 12, 14C and 15, and as contained within the application documentation.
3. Prior to their use on the development samples of all external facing and roofing materials shall be submitted to and approved in writing by the Local Planning Authority. The development shall only be carried out in strict accordance with such details as are approved.
4. All windows and doors shall be timber only and, prior to their installation on each dwelling, drawings to a scale of 1:5 and 1:20 fully detailing all new or replacement windows and doors shall be submitted to and approved in writing by the Local Planning Authority. The details shall fully describe the proposed materials, decorative/protective finishes, method of opening and glazing type and include cross sections for glazing bars, sills and heads etc. The works shall only be carried out in strict accordance with such details as may be approved and the windows shall thereafter only be replaced on a like for like basis.
5. Prior to first use of the development, all external joinery shall receive a painted finish in accordance with a colour which has been submitted to and approved in writing by the Local Planning Authority. The colour of the painted finish shall not thereafter be changed without the prior written consent of the Local Planning Authority.
6. All roof lights hereby approved shall be 'conservation type' only fitted flush with the adjoining roof surface.
7. All new and any replacement rainwater goods shall be cast iron and coloured black.
8. Notwithstanding the approved site plan (Dwg No. 01E) and within 3 months of commencement of development, full details of a hard and soft landscaping scheme, to include bin storage, native tree and hedge planting as well as type, positions, materials and design of all boundary treatments, together with a timescale for implementation of works shall be submitted to and approved in writing by the Local Planning Authority.
9. The landscaping scheme submitted and approved in connection with condition no. 8 shall be fully implemented in all respects within the agreed timescale and in strict accordance with the approved scheme.
10. The planting scheme implemented in connection with condition no. 9 shall be permanently retained. Any planting which becomes severely damaged or seriously diseased, or is in poor physiological condition and/or are removed without the written permission of the Local Planning Authority



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shall be replaced within the next available planting season by trees or shrubs of similar size and species to those originally required to be planted.

11. No part of the development shall commence until a scheme for the comprehensive and integrated drainage of the site indicating provision for foul water, surface water and land drainage has been submitted to and approved in writing by the Local Planning Authority. Prior to the submission of those details, an assessment shall be carried out into the potential for disposing of surface water by means of Sustainable urban Drainage Systems (SuDS) in accordance with the principles of sustainable drainage systems set out in Technical Advice Note 15: Development and Flood Risk, and the results of the assessment shall be submitted in writing to the Local Planning Authority. Where a SuDS scheme is to be implemented, the submitted details shall:

- i) Provide information about the design storm period and intensity, the method employed to delay and control the surface water discharged from the site and the measures taken to prevent pollution of receiving ground water and/or surface waters;
- ii) Specify the responsibilities of each party for the implementation of the SuDS scheme, together with a timetable for that implementation; and,
- iii) Provide a timescale for implementation, management and maintenance plan for the lifetime of the development which shall include the arrangements for adoption by any public authority or statutory undertaker and any other arrangements to secure the operation of the scheme throughout its lifetime.

12. No part of the development shall be occupied until the sustainable drainage scheme for the site has been completed in accordance with condition no. 11. The sustainable drainage scheme shall be managed and maintained thereafter in strict accordance with the agreed management and maintenance plan.

13. Prior to first use of the development hereby approved, the existing eastern vehicular access to the site shall be permanently closed in accordance with a scheme which has been submitted to and approved in writing by the Local Planning Authority.

14. Prior to first use of the development hereby approved, the central vehicular access shall provide visibility splays of 2.4m x 43m in both directions measured to the centreline of the adjoining carriageway. Within these splays there shall be no obstruction in excess of 1m in height above the level of the nearside edge of the adjoining highway. The splays shall thereafter be permanently retained clear of any such obstruction to visibility.

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15. Prior to first use of the vehicular access hereby approved, the access shall be surfaced with hard bound materials (e.g. bituminous macadam) for a minimum distance of 10 metres behind the adjoining highway.

16. There shall be no gates or other means of enclosure across the vehicular access point within 10 metres of the highway boundary.

17. A compliance audit shall be carried out by a qualified ecologist, independently of the appointed principal ecologist, in accordance with details which have been submitted to and approved in writing by the Local Planning Authority. A copy of the completed audit reports should be submitted to and approved in writing by the Local Planning Authority after each phase of development.

18. No part of the development shall commence until details of the proposed Reasonable Avoidance Measures (RAMs) have been submitted to and approved in writing by the Local Planning Authority. The details shall include the following:

- a) Details of a tool box talk on the identification and ecology of great crested newts to be made available to all construction staff employed on the project;
- b) Details of an artificial amphibian hibernacula to be constructed adjacent to the site (Details of the design can be found in great crested newt mitigation guidelines - August 2001);
- c) Details of a walk over survey of the site prior to commencement of development, and a destructive search (under the supervision of a licensed great crested newt handler) made of any potential great crested newt habitat (such as rubble piles or sheet materials that are on the site) on the site. Any amphibians found should be relocated to the artificial hibernacula;
- d) Details of storage of material on pallets off the ground and bulk materials which are to be delivered on site and used within the day of delivery.
- e) Confirmation that excavated trenches will be covered over at the end of each working day with plywood and the edges sealed with sand or soil. Trenches are to be checked each morning for amphibians. Any amphibians located are to be moved to the artificial hibernacula.

The development shall be carried out in strict accordance with the RAMs as are approved.

19. Notwithstanding the provisions of the Town and Country Planning (General Permitted Development) Order 2013 and 1995 (or any order revoking or re-enacting that Order with or without modification), no further development shall take place under Classes A - E of Schedule 2 Part 1 or Class A of Schedule 2, Part 2 other than the development hereby granted permission.

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20. No works shall commence until an appropriate photographic survey, equivalent to an English Heritage Level 1 study, of the existing building/s has been carried out in accordance with details to be submitted to, and approved by, the Local Planning Authority. The resulting digital photographs should be forwarded on a CD to the Local Planning Authority and the Development Control Archaeologist, Clwyd-Powys Archaeological Trust, 41 Broad Street, Welshpool, Powys, SY21 7RR. Email: markwalters@cpat.otg.uk Tel: 01938 553670. After approval by the Local Planning Authority, a copy of the photographs should also be sent to the Historic Environment Record Officer, Clwyd Powys Archaeological Trust for inclusion in the regional Historic Environment Record.

21. The redundant barns annotated for demolition on approved Plan No. 15 shall be permanently removed from the land prior to commencement of the development hereby approved.

22. The development shall be carried out in strict accordance with the recommendations and bat mitigation measures as detailed within the Bat Surveys Report carried out by Leigh Ecology, referenced Rig-001 and dated 25 July 2019 approved as part of this application.

23. Prior to first use of the development, an external lighting scheme shall be submitted to and approved in writing by the Local Planning Authority. The scheme shall:

- a) identify those areas and features on site that are particularly sensitive for wildlife and that are likely to cause disturbance in or around their foraging or commuting routes; and
- b) Indicate where external lighting will be installed and the type of lighting to be used.

The scheme as is approved shall be fully implemented in strict accordance with the details as are approved and no other external lighting shall be installed on any part of the site.

24. No part of the development shall commence until a site wide Biosecurity Risk Assessment has been submitted to and approved in writing by the Local Planning Authority. The risk assessment shall include measures to control or remove invasive species both during construction and operation.

25. No part of the residential / domestic use shall extend beyond the residential curtilage as is edged in green colour on the submitted proposed site layout plan ref: 01E hereby approved.

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		<b>Decision Date</b>	27/01/2020

**Reason(s)**

1. To comply with Section 91(3) of the Town and Country Planning Act, 1990.
2. To comply with section 71ZA (2) of the Town and Country Planning Act 1990.
3. To ensure a satisfactory standard of appearance of the development in the interests of the visual amenities of the area in accordance with Policies GDP1 and PS2 of the Wrexham Unitary Development Plan.
4. To ensure the works reflect the character and appearance of the building in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
5. To ensure the works reflect the character and appearance of the building in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
6. To ensure the works reflect the character and appearance of the building in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
7. To ensure the works reflect the character and appearance of the building in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
8. To ensure a satisfactory standard of appearance of the development in the interests of the visual amenities of the area in accordance with Policies GDP1 and PS2 of the Wrexham Unitary Development Plan.
9. To ensure a satisfactory standard of appearance of the development in the interests of the visual amenities of the area in accordance with Policies GDP1 and PS2 of the Wrexham Unitary Development Plan.
10. To ensure a satisfactory standard of appearance of the development in the interests of the visual amenities of the area in accordance with Policies GDP1 and PS2 of the Wrexham Unitary Development Plan.
11. To ensure satisfactory drainage of the site and to avoid flooding in accordance with Policies GDP1 and EC13 of the Wrexham Unitary Development Plan.
12. To ensure satisfactory drainage of the site and to avoid flooding in accordance with Policies GDP1 and EC13 of the Wrexham Unitary Development Plan.
13. In the interests of highway safety in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.



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14. In the interests of highway safety in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
15. To ensure that no deleterious material is carried onto the highway, in the interests of highway safety in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
16. In the interest of the free and safe movement of traffic on the adjacent highway and to ensure the formation of a safe and satisfactory access in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
17. To protect named species / habitats / biodiversity which would otherwise be damaged / lost by the development hereby permitted in accordance with Policies GDP1 and EC6 of the Wrexham Unitary Development Plan.
18. To protect named species / habitats / biodiversity which would otherwise be damaged / lost by the development hereby permitted in accordance with Policies GDP1 and EC6 of the Wrexham Unitary Development Plan.
19. To comply with section 71ZA (2) of the Town and Country Planning Act 1990.
20. To provide for a record of a building or buildings of local architectural or historic interest in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
21. To ensure a satisfactory standard of appearance of the development in the interests of the visual amenities of the area in accordance with Policies GDP1 and PS2 of the Wrexham Unitary Development Plan.  
To protect the amenities of the occupiers of nearby properties in accordance with Policy GDP1 of the Wrexham Unitary Development Plan.
22. To protect named species / habitats / biodiversity which would otherwise be damaged / lost by the development hereby permitted in accordance with Policies GDP1 and EC6 of the Wrexham Unitary Development Plan.
23. To protect named species / habitats / biodiversity which would otherwise be damaged / lost by the development hereby permitted in accordance with Policies GDP1 and EC6 of the Wrexham Unitary Development Plan.
24. To ensure that an approved Biosecurity Risk Assessment is implemented to secure measures to control the spread and effective management of any invasive non-native species at the site.

<b>Applicant</b>	GRAHAM, TERENCE AND LINDA RIGBY AND DONE	<b>Code Number</b>	ISY P/2019/0647
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		<b>Decision Date</b>	27/01/2020

25. To ensure a satisfactory standard of appearance of the development in the interests of the visual amenities of the area in accordance with Policies GDP1 and PS2 of the Wrexham Unitary Development Plan.

**Note(s) to applicant**

An European Protected Species (EPS) Licence is required for this development. This planning permission does not provide consent to undertake works that require an EPS licence. It is an offence to deliberately capture, kill or disturb EPS or to recklessly damage or destroy their breeding sites or resting places. If found guilty of any offences, you could be sent to prison for up to 6 months and/or receive an unlimited fine. To undertake the works within the law, you can obtain further information on the need for a licence from Natural Resources Wales on 0300 065 3000 or at <https://naturalresources.wales/conservation-biodiversity-and-wildlife/european-protected-species/?lang=en>

All works relating to this development which are audible beyond the site boundary should be carried out only between 7.30 and 18.00 hrs Monday to Friday, and 08.00 to 14.00 hrs on a Saturday, and at no time on a Sunday or a Bank Holiday. Outside these times, any works which are audible beyond the site boundary have the potential to cause unreasonable disturbance to neighbouring premises.

The applicant is advised that the Council has the option to control construction noise by serving a Control of Pollution Act 1974, Section 60, Notice where deemed necessary, and failure to comply with such a Notice can result in prosecution.

The applicant should adhere to the times given above wherever possible. For further information and advice regarding construction noise please contact the Council's Housing and Public Protection Department on 01978 315300.

Burning of waste generated from construction activities is not considered to be an appropriate method of disposal and action may be taken as follows:

- Under the Environmental Protection Act 1990 anyone found disposing of construction site waste by burning is likely to be in breach of their duty of care with regard to waste disposal;

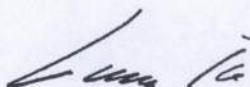
<b>Applicant</b>	GRAHAM, TERENCE AND LINDA RIGBY AND DONE	<b>Code Number</b>	ISY P/2019/0647
<b>Agent</b>	S MURRAY & ASSOCIATES CROSS COTTAGE CASTLE STREET HOLT WREXHAM LL13 9YL	<b>Date Received</b>	23/08/2019
		<b>Decision Date</b>	27/01/2020

- Under the same Act an abatement notice may be served where smoke is judged to be causing a nuisance to neighbouring properties. Failure to comply with the requirements of the notice can result in prosecution;
- Under the Clean Air Act 1993 it is an offence for a commercial activity to burn anything that gives rise to dark smoke.

To prevent offences under the above named Acts there should be no bonfires on the site, to include the prohibition of the burning of cleared vegetation. The applicant should contact the Council's Environment and Planning Department on 01978 315300 for further advice and information.

The Applicant is advised that under the Environmental Protection Act 1990, dust from construction and/or demolition activities can be judged to be causing a statutory nuisance to neighbouring properties. A legal notice can be served requiring that any dust nuisance is abated and failure to comply with the requirements of the notice can result in prosecution. The applicant should contact the Council's Housing and Public Protection Department on 01978 315300 for further advice and information.

There should be no burning of manure and soiled horse bedding at the site.



**Officer Appointed for this purpose  
Chief Officer Planning & Regulatory**

Refer to Statement of Applicant's Rights and General Information on our planning web site at:-  
[http://www.wrexham.gov.uk/english/planning\\_portal/publications/info\\_sheets.htm](http://www.wrexham.gov.uk/english/planning_portal/publications/info_sheets.htm)

Maes Y Ffynnon,  
Penrhosgarnedd,  
Bangor,  
Gwynedd  
LL572DW

Wrexham County Borough Council,  
The Guildhall,  
Wrexham,  
LL11 1AY

ebost/email:  
northplanning@cyfoethnaturiolcymru.gov.uk

16/12/2022

Annwyl Syr/Madam / Dear Sir/Madam,

**BWRIAD / PROPOSAL: Discharge of conditions 8 (Landscaping), 11 (Drainage), 17(Ecology), 18 (Ecology) and 24 (Ecology) of planning permission P/2019/0647**

**LLEOLIAD / LOCATION: Lower Farm, Lower Farm Road, Bowling Bank, Wrexham (DOC 8, 11, 17, 18, 24)**

Thank you for consulting Cyfoeth Naturiol Cymru / Natural Resources Wales about the above, which we received on 11.11.2022.

**We have concerns with the application as submitted. We do not recommend your Authority discharges Conditions 11, 17 & 18 for the following reasons.**

#### **Condition 8 – Landscaping**

We have no comments to make on the discharge of condition 8 of permission P/2019/0647, as we did not request this conditions in our original response.

#### **Condition 11 - Drainage**

We note the application site is within the catchment of the River Dee and Bala Lake Special Area of Conservation (SAC). As you are aware, on the 21<sup>st</sup> January 2021, we published an evidence package outlining phosphorus levels for all river SACs across Wales. In line with our [Planning Advice](#) (July 2022), under the Habitats Regulations, Planning Authorities must consider the phosphorus impact of proposed developments on water quality within SAC river catchments. We therefore advise you to consider whether the proposals, as submitted, would increase the volume of foul discharge from the site in planning terms.

We note this is a discharge of condition application relating to a number of conditions including Condition 11 ( Drainage) of planning permission P/2019/0647. As such, even

though the development proposed was judged to be acceptable in principle when the original permission was granted, that decision predates the publication of our evidence package. Therefore, we advise that you need to consider the implications of this as part of your determination of this application.

We note from the information submitted that a new private treatment plant is to be installed to provide foul drainage for the conversion of the outbuildings to 5 dwellings. Therefore, the development has the potential to increase the amount of phosphorus being discharged from the site. As such, we refer you to our Planning Advice. We note that information has already been submitted in relation to proposed foul drainage arrangements, however we advise you to seek further information as identified in the section titled 'What does this mean for development proposals involving private sewage treatment systems' of that advice.

Ultimately, it is for your Authority to consider to what extent you treat this advice as a material consideration in the context of the current application. If you determine that NRW's Planning Advice is a material consideration to this application, then you will need to consider the Habitats Regulations and screen the proposal accordingly.

### **Condition 17 - Ecology Compliance Audit**

Details in relation to the Ecology Compliance Audit have not been submitted and therefore we are unable to recommend the discharge of this condition at this time.

### **Condition 18 – Reasonable Avoidance Measures**

We note the submission of the following document; Clearance of Environmental Conditions, Report Reference DoC 22-04 104.1, dated 29<sup>th</sup> September 2022.

We welcome the submission of the proposed Reasonable Avoidance Measures; however, we refer to our Planning Response (Reference CAS-99111-H4G5) which requested that due to the proximity of 2 ponds, and the historic records of GCN within them, that barrier fencing should be implemented alongside the proposed amphibian method statement.

We therefore maintain our advice and suggest that one-way GCN exclusion fencing should be used alongside the described methods. On inclusion of the use of one-way barrier fencing into the RAM's, we would have no further concerns and would advise to the LPA that the Condition can be discharged.

However, at present we are unable to recommend the discharge of this condition.

### **Condition 24 - Biosecurity**

We note the described biosecurity measures, and we have no further concerns in this regard, and advise that this condition can be discharged.

### **Other Matters**

Our comments above only relate specifically to matters included on our checklist, *Development Planning Advisory Service: Consultation Topics* (September 2018), which is published on our [website](#). We have not considered potential effects on other matters and do not rule out the potential for the proposed development to affect other interests.

We advise the applicant that, in addition to planning permission, it is their responsibility to ensure they secure all other permits/consents/licences relevant to their development. Please refer to our [website](#) for further details.

If you have any queries on the above, please do not hesitate to contact us.

Yn gywir / Yours faithfully

**Sara Thomas**

Cynghorydd - Cynllunio Datblygu / Advisor - Development Planning  
Cyfoeth Naturiol Cymru / Natural Resources Wales